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ORIGINAL ARTICLES.

CASES OF ARTIFICIAL ANUS AND FECAL FISTULA TREATED BY INTRAPERITONEAL OPERATION.*

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INTESTINAL RESECTION FOR THE CURE OF ARTIFICIAL ANUS MADE FOR THE RELIEF OF INTERNAL STRANGULATION FOLLOWING HERNIOTOMY FOR STRANGULATED HERNIA; RECOVERY.

A man aged sixty-seven years was admitted to the Methodist Hospital on November 21, 1895, with strangulated inguinal hernia of the right side. He had suffered with this hernia for about forty years, and it had previously been operated upon twice because of the occurence of strangulation. Upon examination it was found that there was a small hernia on the left side and a large inguino-scrotal hernia of the right side which was strangulated. I promptly cut down upon the hernia, relieved the strangulation and did an operation for the radical cure by the method of Bassini. The hernia consisted of the entire cecum, which showed a dimple-like depression at one point, evidently representing the appendix, which was congenitally absent. Subsequent inquiry of the surgeons who had operated upon the man previously proved that his appendix had never been removed, and that his case was therefore one of congenital absence of the organ. There were a good many old adhesions uniting the coils of intestine in the neighborhood of the cecum.

The patient showed very little shock after the operation, and did well for one day, when his abdomen became somewhat tympanitic and painful. The next day the pain and tympanites had increased, and vomiting occurred when attempts were made to have his bowels moved by sodium phosphate. I determined to make an incision in the median line, because it was evident that there was an obstruction in the intestinal canal.

Active peritonitis was present and a portion of the small intestine just above the ileo-cecal valve was found to be dark in color, as if it had just been relieved of some encircling constriction. It was evident that this portion of the intestine, about two inches long, had been strangulated by being entangled in some of the twisted masses of adherent intestine resulting from the previous attacks of inflammation. This bowel was so dark, and the activity of the peritoneal inflamma-

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tion so great, that I made an incision into the gut and allowed a quantity of feces and gas to be expelled. Being afraid to put this dark and gangrenous-looking bowel back into the abdomen, I stitched the knuckle of intestine to the center of the incision. The opening through which I had permitted the evacuation of feces and gas was closed with a hemostatic forceps, and the wound above and below the protruding bowel closed with sutures. Before doing this I also punctured the intestines within the abdomen in another place with the aspirating needle, to allow the escape of gas, and closed the opening with sutures.

After the intestine had been stitched to the abdominal wall I found that it had regained its normal color. This showed that it is probable that the gut would not have become gangrenous at this point and could have been returned, though it is questionable whether such a proceeding would have been wise when the distention and the violence of the peritoneal inflammation were so great.

Inflammation of the belly-wall around the protruding knuckle of bowel took place and an abscess formed in connection with some of the stitches. After the tympanites and active signs of intra-abdominal inflammation had subsided, I endeavored to close with sutures the opening which had been made in the protruding portion of the bowel. Two attempts were made to do this, but both of them failed, because gas and feces forced their way through the opening, notwithstanding the presence of the sutures applied after the method of Lembert. The final result, therefore, was the production of an artificial anus in the intestine left stitched in the incision.

The anterior surface of the abdomen became the seat of a very painful and extensive eczema which caused the patient much pain, and gave us a great deal of annoyance. On January 11, 1896, I operated for the cure of artificial anus, although I thought the operation was likely to be much complicated by the difficulty of preventing infection from the eczematous skin.

An incision was made above and below the opening in the bowel; this was then detached from the abdominal wall and the adhesions of the neighboring portions of intestine separated. During this stage of the operation my finger tore the bowel just above the artificial anus. Four inches of gut which included this tear and the abnormal anus were then resected and a circular suture of the intestine made with two rows of Lembert sutures of silk. No portion of the mesentery was removed, but the portion corresponding to the removed bowel was folded. A drainage-tube was introduced because of the probability of infection, and the wound closed. The subsequent history of the case was unimportant, though there was some suppuration about the stitches, one or two of which were subjected to great tension because of the retraction of the belly-wall at the seat of the artificial anus. The patient recovered without special symptoms worthy of record.

TWO CASES OF FECAL FISTULA, RESULTING FROM SLOUGHING HERNIA, CURED BY CELIOTOMY AND INTESTINAL SUTURE.

A woman, over sixty years of age, had been operated upon several years previously for strangulated femoral hernia on the right side. On examination at the Woman's Hospital I found a minute orifice in the right groin, from which a small amount of liquid feces escaped more or less continuously. The tissues around were irritated by the escaping fluid. The opening would only admit the end of a probe. I therefore concluded to attempt closure by making an elliptical incision around it, dissecting out the tissue at the edges and suturing the wound left by this procedure. After making the elliptical incision, the wound and fascia were dissected up, the mucous membrane lining the small opening in the intestine turned inwards and catgut sutures applied in such a way as to close the intestinal orifice. The edges of the integument were brought together by interrupted sutures of silk, and an occlusive dressing of iodoform and collodion was then applied.

The operation, however, was unsuccessful, and fecal matter soon began to ooze through the wound, which failed to unite. The patient became very much discouraged and had rather serious symptoms a couple of weeks after the operation from partial suppression

of urine. This condition, however, had no relation to the operation. After getting her kidneys to act more satisfactorily, I, on November 15, 1895, four weeks after the operation just described, made a four-inch incision in the median line of the abdomen, between the pubes and the umbilicus, and elevated the pelvis so as to throw the intestines upwards toward the diaphragm. A loop of small intestines was found adherent to the edges of the internal femoral ring. The external opening, through which feces had been escaping, communicated with the interior of this loop of bowel. A piece of gauze was carried beneath the adherent coil, and the rest of the intestines protected as much as possible by pads of gauze. I carefully separated the bowel from the abdominal wall around the margin of the ring, and drew it out of the incision. A double row of Lembert's sutures of silk were used to close the opening in the detached bowel. The line of suturing was made transverse to the long diameter of the gut in order to make as little constriction at that point as possible. The fistulous opening was then cut out by transfixing the abdominal wall, after thorough cleansing of the excoriated surface of skin around the site of the fistula. Catgut sutures were passed through the abdominal wall to close the opening, and the peritoneal surfaces beneath were drawn together by catgut sutures introduced from within the abdomen. The abdominal incision was then closed in the ordinary way with silk sutures. The convalescence was uninterrupted. The beneficial moral effect of the operation upon the patient was very marked.

I had first intended to operate by the intra-abdominal route, when the woman first came under my care, but was led to do the less serious operation by the exceedingly small orifice through which the contents of the bowel escaped.

A year and a half ago I operated upon a similar case in a feeble, old woman, of sixty-four, who had had for about two years an artificial anus in the left groin, due to a sloughing femoral hernia. An unsuccessful attempt to close this fistula had been made, it was said, at the Presbyterian Hospital, about fifteen months before I saw her at the Jewish Hospital. Fecal discharges occurred in small quantities almost constantly, and the woman seemed greatly depressed by their occurrence. Her age and feebleness made me hesitate for a long time to operate upon her. In October, 1894, however, I finally concluded that the risk was justifiable. The case was not one suitable for using the Dupuytren enterotome, as there seemed to be no special spur to be divided. A median incision was made and the patient put in the Trendelenburg position. The attachment of the bowel to the abdominal wall was much more extensive in this case than in the other. The fecal fistula was really sufficiently large to be called an artificial anus, for nearly all the contents of the bowel escaped here. This was quite different from the condition of the other patient, in whom nearly all the alvine evacuations passed through the normal route. In both instances an effort was made to prevent contamination of the operative wound by the discharges coming from the fistula. In the present case, I sewed the cutaneous margins of the fistula together over the orifice before making the median incision. The gut, where attached to the abdominal wall, was encircled by a ligature, which was drawn sufficiently tight to prevent the escape of feces into the abdomen when I detached the intestine from the neighborhood of the femoral ring. This was done because the opening was a large one, and I feared fecal material would pour out into the peritoneal cavity. After the bowel was cut loose with the scissors, intestinal sutures were applied, so as to close the opening in a transverse direction. The bowel was then dropped into the abdominal cavity. This step of the operation left an opening in the anterior abdominal wall at the site of the femoral canal lined with mucous membrane, which had been left by cutting away the attached intestine on the inner side. The woman's condition was rather bad, and I therefore did not dissect out all this tissue and bring the raw surfaces in contact as in the first case. Some of the mucous membrane, however, was dissected away. The rest was allowed to remain and the opening closed spontaneously

by Nature's efforts. This portion of the operation I considered unsatisfactory, because of the prolongation of convalescence. It would have been better if I had encircled the opening with an incision through the entire abdominal wall and brought the parts together, so as to get primary union. This is easily done when the abdominal cavity is open, because the surgeon has access to both sides of the orifice. In the other case this method was used satisfactorily. With a sponge pushed up against the internal orifice I was able to prevent wounding of the intestine when the knife was entered from the external surface, and also avoided contaminating the peritoneal cavity by secretions from the inflamed skin around the old artificial anus.

AN UNUSUAL ALVEOLAR ABSCESS, WITH ANTRAL COMPLICATIONS.*

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So far as I know, this case presents several unique features. The patient, a male, aged forty years, first consulted me with reference to a dull aching and somewhat indefinable pain in the gum covering the buccal surface of the first molar tooth of the upper jaw on the left side. The teeth were in fairly good condition, with the exception of some retraction of the gums in both upper and lower jaws. Further than this I could detect only a slight redness over the seat of pain.

I at once referred him to a dental surgeon of considerable repute, whose diagnosis was guarded and his treatment soothing and mildly counter-irritant. About a week elapsed, when to our surprise there appeared from under the gum along the tooth and between it and its fellow, the first molar, a slight discharge of thin pus. We then thought that we were dealing with a diseased pulp at the apex of the root, and the tooth was opened and the pulp found to be perfectly healthy. It appeared that we had an abscess entirely external to the tooth-substance and probably situated at or near the bifurcation of its roots. The discharge increased and we decided to drill through the crown of the tooth and try to drain and treat the abscess through this opening; but we failed to find the pus-sac.

The dental surgeon seemed entirely at a loss to explain the cause or the exact seat of the trouble, and upon exploring with a delicate probe one day this passed into the antral cavity at the point where the external wall of the antrum joins the alveolar process. He assured me that no force was used, but the patient complained of very severe pain. From this time the inflammation rapidly extended into the antrum and within three days we had to deal with an acute inflammatory condition of the maxillary sinus and the left nasal cavity and post-nasal space. Fortunately the ostium maxillare was patent, and the discharge, which was of a muco-purulent character, and very profuse, oozed freely through the nose both anteriorly and posteriorly. During this time the antrum was syringed through the alveolar opening. I advised the immediate removal of the tooth, but my consultant, thinking that the cause of the trouble was external to the tooth and independent of it, persuaded me to wait a few days longer, to continue to favor drainage and to use the usual stimulating and antiseptic lotions. But on the second day thereafter the inflammation became so severe and the discharge from the nose increased so enormously that I insisted upon the removal of the tooth. This had to be done with great care, for the bone-substance entering into the formation of the alveolar process and the external wall of the antrum was very delicate and thin and the roots of the tooth were large.

The tooth was removed, however, without accident and there was found

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to be a small pus-sac in the peridentium of the inner margin of the anterior buccal root about midway between its apex and its base. The sac was so small that I was slow to believe at first that it could be the sole cause of the disturbance; but the tooth itself was, as I have said, living and perfectly healthy in all its parts, with the exception of this small spot on its covering membrane, and after the most careful examination of the alveolar cavity we could find no disease whatsoever. In still further proof of the fact that the cause originated at this spot there was no further discharge from the cavity, and within three days the antral inflammation subsided and the patient was practically well.

To my mind this case presents at least two very interesting features. First, the origin of the trouble: A pus-sac forms in the covering membrane of a tooth of a perfectly healthy man at a point considerably removed from all external influences. What was the cause of this formation? How did it get there? Second, the rapid development of the antral complications as soon as communication was made between the antrum and the alveolar abscess; and notwithstanding the general inflammatory condition of the antrum and the copious discharge, there was no pain whatever, the only symptom being that referred to the nose and the opaque condition found with the electric light transmitted through the maxillary bones.

A CASE OF ACUTE LOSS OF VISION FROM DISEASE OF THE ETHMOID AND SPHENOID CAVITIES.*

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R. D., aged seventeen years, awoke on the morning of February 13, 1896 with severe headache, located mainly in the frontal region, and almost absolute loss of vision. He had gone to bed the night before in his usual health, free from any disturbance of sight. In the early part of January he had a well-marked but uncomplicated attack of measles, which ran the usual course. Two weeks later he had entirely recovered, and resumed his occupation as driver and stable-boy. One night, being very tired, he threw himself on the floor behind the stove in the kitchen, and slept there till morning. On February 19th, he was brought to the Polyclinic Hospital by Dr. H. M. Beatty, of Trenton, N. J. During the week that intervened between the onset of the attack and his visit to the hospital, his vision had grown worse and his mental powers had become slightly dulled, but he no longer suffered from the excruciating headache that had tormented him for four days. Upon examination the following ocular conditions were noted: The lids and conjunctivæ were normal, the corneæ and anterior chambers clear, and the latter of normal depth; the irides were moderately dilated, and absolutely unresponsive to light; the lenses were clear; the vitreous chambers were clouded by a great quantity of minute opacities (punctate hyalitis); the fundus of each eye was dimly seen, but its condition could be determined with moderate accuracy; the optic discs were pale; the arteries slightly contracted, and the veins normal in caliber; the edges of the disc were not obscured by other exudation than that in the vitreous; there was no optic neuritis or choking of the disc; each retina was edematous and toward the periphery a few grayish, curved lines, marking linear detachments of the retina from the choroid, were visible in the lower parts. Vision was reduced to the perception of light in the extreme temporal parts of the field. The boy

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was emotional, easily excited and of slow mentality. Upon admission his temperature was 99°, the respirations, 24; the pulse, 104, full and strong. There was no pain in the eyes or head. The urine was free from sugar and albumin; its specific gravity was 1022. The patient was bled from the arm, about seven ounces of blood being removed; elaterin, one-quarter grain, was administered, and he was given a hypodermic injection of pilocarpin, one-quarter grain and a hot bath. On the following day the pulse had fallen to 56, and was weak and compressible and occasionally intermittent; the temperature and the respirations were normal; intellection was more active. In the absence of an assignable cause for the ocular and cerebral edema, the boy was referred to Dr. Walter J. Freeman for examination of the cavities of his head. Dr. Freeman's report is as follows: The view of the interior of the nose was completely obstructed anteriorly by immensely swollen turbinals, but posteriorly muco-pus in considerable quantity was seen flowing from the choanæ.

Thorough cocainization produced contraction of the congested intra-nasal tissues, and the fossæ soon became filled with thick purulent secretion, which came from both the superior and the middle meatus, right and left, and from the upper back part of the left fossæ. Transillumination of the maxillary and frontal sinuses, together with the absence of the other symptoms of any disease of these cavities, pointed clearly to a diagnosis of acute purulent inflammation of the anterior and posterior ethmoid cells on both sides and of the left sphenoid sinus. The ethmoid arteries, branches of the internal carotid, through the ophthalmic, and the return veins which empty into the cavernous sinus, bring the affected cells into most intimate connection with the circulation about the optic chiasm. Then, too, the inflammation of the sphenoid sinus could readily act injuriously directly upon the chiasm, which immediately overlies it, and from which it is separated by a very thin plate of bone. Atropin internally, together with appropriate local treatment of the intra-nasal congestion, quickly caused the inflammation to subside, and in about ten days the nasal condition was normal, and there was no return of the inflammation of the sinuses.

Dr. S. D. Risley met me in consultation and confirmed the ocular findings already recorded. Dr. Risley hesitated to attribute the blindness to the ethmoiditis and considered the possibility of a common cause. Dr. G. E. de Schweinitz also examined the case, and his report was in accordance with my own findings; he made a diagnosis of acute double retro-bulbar neuritis from ethmoditis. During the succeeding days the general condition improved, the nasal inflammation was reduced by the treatment carried out by Dr. Freeman, and the vitreous opacities cleared so that the details of the fundus could be examined accurately. The edema of the retina grew less and less; the linear detachments disappeared, but the vessels, both arteries and veins, became smaller and the neves paler; the outlines of the disc were clear, showing no exudation about the nerve-head. Day by day the ethmoiditis improved, until pus could be no longer seen coming from the ethmoid cells; the discharge from the sphenoid was the last to disappear. The cure of the ethmoid and sphenoid disease was not followed by recovery of vision, although the fields have gradually enlarged and now include the unbroken periphery, in which light-projection has returned, and fingers can be counted on the temporal sides, but a large central scotoma, in which light cannot be seen, persists. The pupils have become responsive to light, but are abnormally dilated; the arteries of the nerve and retina are almost thread-like, and the veins but little larger; whitish points, some glistening and some dull, and punctate disturbances of the pigment-layer can be detected throughout the retina.

In consultation with Drs. Charles K. Mills and W. W. Keen it was decided that there were no indications for operation on the skull.

No symptoms other than those described, namely, pertaining to the eye and the nasal cavities, were elicited after careful scrutiny. We must depend, then, on the ocular and nasal examinations to determine the source of the blindness. Unfortunately our conception of the pro-

cesses that have caused such sad havoc are largely speculative. We know from Dr. Freeman's report that a purulent inflammation of the ethmoid and sphenoid cells existed, but we can only conjecture the relation of this to the blindness. As will be seen from Kuhnt's monograph,[1] similar effects have been observed in the course of disease of the frontal and ethmoid sinuses. Alt reports a case[2] of optic neuritis caused by cauterization of the turbinated bones, which rapidly grew better when the nasal treatment was discontinued. In analyzing the various ocular findings we shall consider them in detail:

1st. Punctate hyalitis, or the collection in the vitreous body of minute dust-like opacities, moving in waves with every movement of the ball, and obscuring, to a considerable extent, the ophthalmoscopic view of the fundus. There was no appreciable difference in the amount of these opacities in the two eyes. While their exact source and nature are unknown, it is probable that they are the products of an exudation from the choroid in the neighborhood anterior to the ora serrata, where the choroid is uncovered by the retinal tissue. Their presence is reasonably accounted for by the supposition that, owing to a sudden increase of tension of the choroidal vessels, either from contraction of the walls of the vessels, or from increase of their contents by stimulation of the sympathetic plexus on the aorta or cavernous sinus, the fluid contents of the blood exuded in part into the vitreous body. Apparently opposed to this hypothesis is the fact that the intraocular tension was not increased; indeed it was slightly below the normal. There was, however, no damming up of the excretion through Schlemm's canal in the periphery of the cornea or disturbance in the flow of lymph from the vitreous into the anterior chamber, and hence no cause for increased tension. The excretion through the cornea was probably on the other hand hastened, as evidenced by the slight reduction of intraocular tension.

2d. The retinal edema was universal and more pronounced near the periphery, where the fluid had collected in curved lines in sufficient amount to separate the retina from the choroid. The arteries were contracted and the veins of normal caliber. The discs were well outlined and not more blurred on the edges than the retina in other portions of the fundus. The retina had lost its transparency, was gray in color and seemingly saturated with serum. There were no pigment-alterations or hemorrhagic spots, nor did the foveal region differ in color from that of the adjoining parts. This fluid exudation had one of two sources, namely, from the vessels of the retina, or from those of the choroid, or indeed from both. I am inclined to believe that it was derived in great part from the former, the circulation in which was indirectly reduced by interference with that of the venæ vorticosæ, thus cutting off the anastomosis between the choroid and the retina at the foramen sclera. In addition, the current of blood in the central vein of the retina was probably impeded in its course by an obstruction or diminution of caliber, either in the ophthalmic vein or in the cavernous sinus. As opposed to this view of venous obstruction we must remember important symptoms that were conspicuously absent, namely, choking of the discs, tortuosity of the veins of the retina, and choroidal or retinal hemorrhages. These conditions would undoubtedly have been observed if thrombosis of the choroidal veins or of the ophthalmic vein had been present. We are therefore forced to exclude this possible explanation of ocular complications in ethmoidal disease in our case.

3d. *Loss of Vision.*—There was sudden and absolute loss of light-perception on the temporal half of each retina and preservation of light-projection on the extreme temporal side of each field, or partial functioning of the nasal half or section of the retina, an indistinctly marked bi-nasal hemianopsia. The line of division between the perceptive and non-perceptive sections was not clearly made out. It was determined that central vision was lost in both eyes. In the left, the line of demarcation corresponded to a curved line from above-inward to down-outwards, with its concavity toward the nose. In the right, light-perception was retained only on

[1] Ueber die Enzundlichen Erkrankungen der Stirnhohlen, etc., 1895.

[2] *American Journal of Ophthalmology*, September, 1895.

the extreme nasal portion of the retina, and lost in the macular and all other portions. If we accept the hypothesis of a single lesion we must exclude purely local disturbances, such as thrombosis, embolism or orbital inflammation and refer the active agent back to the chiasm. This solution is the only tenable one. There was undoubtedly inhibition of function of the optic tract, complete for those fibres supplying the nasal half of the retina and partial for those running to the temporal—probably from pressure of the edema on, and edematous infiltration of, the chiasm and nerve-trunks. Direct and active pressure of a new and unyielding growth would have induced serous infiltration of the sheaths and choking of the discs, rather than limitation of the circulation by encroachment on all the vessels by fluid exudation. This hypothesis is again opposed by the diminution in size of the veins of the nerve and retina. We should naturally expect, whatever may be the cause of venous obstruction, whether direct pressure at one point or along the course of the veins, dilatation, tortuosity and rupture of the retinal or choroidal veins—an obstacle that requires considerable speculative ability to overcome, as it seems to invalidate any explanation that has been offered. Kuhnt suggests that acute loss of vision in these cases is to be attributed to thrombosis of the central vein. When the blindness is bilateral the thrombosis must be double or must be situated in some intracranial sinus.

In considering the pathology we must remember that the symptoms common to ocular involvement in disease of the nasal cavities were in large part absent. For instance, there was no edema of the lids, no chemosis of conjunctivæ, no injection of the balls, no exophthalmos, no limitation of movement, no inflammation of the orbital tissues, no hemorrhages. The only symptoms presented by our case were pain in the head, not localized, edema of the vitreous and retina, contraction of the retinal vessels, imperfectly marked bi-nasal hemianopsia, and unresponsive dilated pupils and mental dulness. Later, there were absorption of the vitreous opacities; disappearance of the retinal edema; numerous scattered patches of retinal degeneration; restoration of light-perception and light-projection to all parts of the retina, with the exception of that supplied by the macular fibers; central scotoma; return of pupillary action; and recovery of former mentality. The heart and lungs were normal and there were no signs of kidney-disease (report of Dr. Mays), and no elevation, but a slight depression of temperature.

The most reasonable and least unsatisfactory explanation of the ocular complication is that of a localized meningitis, attended with marked swellings and edema of the periosteum, covering the body of the sphenoid bone induced by purulent disease of its cells, through contiguity of tissue. The optic chiasm was directly attacked by the swelling of its supporting structure. The cavernous sinuses were encroached upon, and the function of the sympathetic plexuses of these sinuses was altered, probably stimulated, with resulting contraction of the coats of the neighboring blood-vessels, through the action of branches given off by the carotid and cavernous plexuses to the ophthalmic, and, perhaps, to the Gasserian ganglia.

In the January number of the English edition of the *Annales d' Oculistique* appears an article by Pergens on "Amblyopia and Amaurosis after Hematemesis." The symptoms and ophthalmoscopic signs in some of the cases recorded closely resemble those of my case. The blindness, edema and optic-nerve atrophy are explained by post-mortem findings of endarteritis and spasmodic contraction of the blood vessels of the optic nerve, retina and choroid.

In Kuhnt's monograph will be found references to the principal publications on the relation of disease of the nasal cavities to diseases of the eye. This writer bases the connection on the anatomic relations of the veins of the nasal cavities to those of the orbit. The orbit is surrounded on three sides by cavities lined with mucous membrane, the veins from which, namely, the supra-orbital, frontal, ethmoid, ophthalmo-facial, empty directly into the ophthalmic vein. Therefore, every considerable swelling and hyperemia of the whole or part of the mucous membrane causes a stasis or hyperemia at the origin of the ophthalmic vein, with consequences modified by

individual peculiarities. He considers the absorption of chemically decomposed pus into the system as a chief factor in inducing all the functional disturbances; in other words, a common cause for the suspension of function of the muscular, refractive and nervous apparatus of the eye.

It is to be regretted that this communication is limited to a recital of the clinical features of the case and to a speculative consideration of the pathologic changes that have produced the disastrous effects on vision. The acute atrophy of both optic nerves is probably a permanent one. Notwithstanding the efficient nasal treatment, improvement of vision has been disproportionately slight. Day by day the arteries and veins of the retinæ have become more and more contracted until they can scarcely be recognized as blood-vessels; the discs have become paler and more atrophic and the retinæ degenerated, until normal structure has almost disappeared; yet the case is one of deep interest because of its rarity and because it illustrates the intimate and fatal causal connection between nasal and ocular disease.

REPORT OF A CASE OF CHOLELITHIASIS.*

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My reason for presenting this report is the obscurity which enveloped the diagnosis, as well as the long train of unpleasant symptoms in its history. The case in question was that of Mrs. J. M. B., aged forty-one, weight 230 pounds, living in conditions of comfort and ease. She was troubled with constipation, but aside from this her health had always been perfect, except about eighteen months previous she had an attack lasting ten or twelve days, with symptoms the history of which resembled biliary obstruction. She lived luxuriantly, and on May 24, 1895, ate quite heartily of the mid day meal; among other things she partook freely of cold-slaw. Two hours after she was seized with an intense pain in the epigastro-hypochondriac region, extending back under the right scapula, from which she was not entirely free for several months. The pain did not continue severe all the time, but there was a constant burning as if a coal of fire had gotten in the stomach, which was very much intensified on taking food or drink of any description. This burning and pain was accompanied with vomiting, severe and persistent, made worse by irritation from ingesta, but coming at intervals when nothing at all was swallowed. It consisted mainly of acid, glairy mucus, in which at long intervals were intermingled minute specks of blood. Dr. N. S. Walker, who had charge of the case, stated that prior to my first visit no elevation of temperature had been observed, and on this occasion the mercury registered only 99½° F. Examination revealed a very tender and painful point on pressure, just below and a little to the right of the ensiform cartilage. No tumor could be detected. The pain, tenderness and persistent vomiting suggested the possibility of gastritis, which Dr. Walker already had under consideration. Jaundice was present, but not nearly so marked as it became later on. The temperature began to range higher, the pain and vomiting persisted, no kind of treatment seeming to give even temporary relief. In the course of a few days Dr. Sales, of Memphis, was called, and after a very careful examination gave as a diagnosis hepatitis. By this time the jaundice was more marked, and deep palpation indicated engorgement and sensitiveness to pressure in the liver. While Dr. Sales favored the idea of hepatitis, which might become suppurative, yet he related an instance where a patient, without symptoms to

*Read at meeting of Tennessee State Medical Society, April, 1896.

particularly indicate such result, had developed malignant disease.

The symptoms continued without abatement, rigors occurring, but no sweating, except that which came as the result of antipyretics. A few days after Dr. Sales' visit he was communicated with by telephone, when he advised aspirating the liver for pus. His presence was desired, but he could not come. The persistency of the pain in the same locality, the obstinate vomiting, the rapidly-increasing jaundice, the conjunctiva, skin and urine clearly indicating the presence of bile in abundance, the rigors and absence of bile in feces, connected with the sudden onset, suggested to Dr. Walker and myself the possibility of biliary obstruction. Therefore, on the morning of June 13th, we administered six ounces of olive oil, and in the afternoon, June 14th, there were several alvine evacuations heavily charged with bile. We regret that the discharges were thrown away before a search by straining was made for calculi. The diagnosis still being unsettled, Dr. A. B. Halder, of Memphis, came up on the morning of the 15th, and, after a most thorough and critical examination, advised an exploratory operation for the purpose of ascertaining the cause of trouble. Accordingly, preparations were made for an immediate operation. An incision was made over the region of the gall-bladder, and the organ partially exposed. It was found adherent to the surrounding parts, and could not be brought well up into the wound. It was contracted and, to my touch, of semi-solid consistency, this semi-solidity, in Dr. Halder's opinion, amounting to a "stony hardness." The contracted condition of the gall-bladder, the "stony hardness," its fixedness and the apparent absence within its cavity or in the ducts of calculi, seemed to preclude the advisability of further operative interference. After palpation and inspection, and as a matter of precaution, introducing an aspirator with negative result, the liver was thought to be normal, and therefore hepatic abscess eliminated. Considering the trouble irremediable and most probably malignant, Dr. Halder so announced, and proceeded to close the opening. The patient bore the operation splendidly and reacted well. There was at once a decided amelioration in the symptoms, the temperature ranging below 100° F., the pain not so severe, the vomiting more infrequent, the dejecta continuing to show the presence of bile, the urine rapidly losing its saffron hue and the skin and conjunctiva gradually assuming their normal appearance. At the time it was difficult to divine whether the change was due to the olive oil on the 13th, followed by bilious discharges on the 14th, or to the operation on the 15th, with the manipulations necessary to the same. Competent observers say that aspiration of the liver, though no pus be found, is often followed by improvement, hence this might be the reason. On the other hand, occasionally calculi are entirely liquefied, and not discovered with the most careful search. The latter seemed most plausible.

After several backsets, attended with high fever, in which quinine was freely and effectively used, she finally became able to sit up a short time each day, but with a great deal of distress, as the nausea was very much increased and a "stuffed feeling" and sense of heavy weight was much more pronounced on assuming the erect position. On the 28th she ate a small amount at the midday meal. During the afternoon the pain returned, but radiated in every direction, so that it was mistaken for ordinary colic, and a simple remedy was administered. It failed to give relief, and as the pain grew more intense an opiate by hypodermatic injection was resorted to. On the morning of the 29th a rigor occurred and the temperature ran to 102°; later in the day another rigor, the temperature rising to nearly 105°. The urine became loaded with bile, the conjunctiva and skin rapidly assumed a deep yellow, the lips and finger-tips were cyanotic, the facial expression pinched and the pulse 130. Dr. Walker was sick, and I, left alone, gave antipyretics with baths, and immediately began the rectal administration of quinine, 100 grains in twenty-four hours. This was continued for several days. In this way the temperature could be somewhat controlled. On lessening the amount of quinine the temperature would rapidly increase, and upon its re-

sumption would again subside; hence, this heroic dosing was justified.

On the morning of August 30th I gave six ounces of olive oil by the stomach, which was retained, and in the afternoon of the 31st she passed a gall-stone about the color and size of a hazel-nut, causing a temporary change for the better. But the vomiting persisted, and it seemed impossible to suggest a form of nourishment which could be retained. To this was added an aching in the limbs, most prominently the left arm and leg, with a burning in the bottoms of the feet. These symptoms, with the extreme hot weather, conspired to make the patient devoutly wish for death. Later on the pain grew more intense, the stomach became, if possible, more irritable, the vomiting of glairy mucus more frequent, and the skin, urine and eyes indicated a resaturation of the blood with bile. The bowels being constipated, I administered a c.c. pill, and the next afternoon was rewarded by finding a second stone larger than the first. During the interval between the passage of these stones quite a considerable quantity of inspissated bile was voided. From the passage of the last stone the improvement was slow, but continuous, until the feeling of fullness, pain and discomfort had entirely disappeared, and she could eat anything she desired with impunity. The skin and eyes cleared and flesh began rapidly to accumulate.

The suffering in the limbs did not cease entirely, but with this exception health seemed about restored, when on March 18, 1896, she was again seized with pain and burning, exactly as before, with a temperature of 103°, but no vomiting. Jaundice made its appearance in twelve or eighteen hours, and every symptom pointed to a return of the original malady. Eight ounces of olive oil were given within a few hours, and this was followed by a whitish, pasty stool the next day. Several ineffectual efforts, as evidenced by pain, were made for the stone to be forced through the duct. Full doses of calomel, followed by salines, phosphate of sodium, and c.c. pills were tried, but the feces continued to show an absence of bile. Evidently the cessation of each paroxysm was caused by the stone slipping back into the gall-bladder, as the burning and most of the tenderness disappeared with the pain. The attacks came from two to four hours after the midday meal, when more food was taken, and hence a greater demand for bile to aid in its digestion. The tertian of intermittency which the paroxysms assumed excited the suspicion that in some way a malarial element was cutting a figure in the causation; therefore, I saturated the system with quinine, and on the night of the 28th, gave two c.c. pills. On the morning of the 29th a third stone was found, similar in color and size to the others. Because of its effect on the catarrhal swelling, as well as a relaxation of the duct-walls, I suspect the quinine was an important factor in aiding the expulsion of the stone. At the time of this writing the patient is again rapidly convalescing.

You can readily see the diagnosis in this case was not easily settled, and because of this the interest became very intense to those directly concerned. The history of perfect health, with the exception mentioned, the free indulgence of cold-slaw and the sudden onset of pain a short while after, the vomiting and burning so severe and persistent that an ice-bag was kept over the epigastrium constantly for three weeks, the foul breath, the rapid small pulse, heretofore not mentioned, pointed with so much positiveness to gastritis that it was perfectly natural this should be considered. There can be no doubt about the presence of an acute gastro-duodenal catarrh, resulting from the irritation to surrounding parts of the impacted gall-stone. This catarrh came near costing our patient her life through its interference with the nutritive process. Hepatic abscess frequently forms in such an insidious manner as to deceive the very elect. I remember a case occurring in Bellevue Hospital, under the service of E. G. Janeway, which had been mistaken for a remittent form of malarial fever. In another case, in the practice of a country physician, an old man of seventy developed the history of abscess of the liver, but a diagnosis to that effect was not made. Finally, rupture into the lungs and death from apnœa was the result.

Again, in my own practice, as a sequel to an attack of dysentery, an old man of sixty presented the symptoms of suppurative hepatitis, with the exception that instead of bulging there seemed to be a retraction of the right hypochondrium. An aspirator was not introduced, and the patient died without rupture or a verification of the diagnosis.

In the case under consideration, the symptoms suggestive of inflammation, and later suppuration in the liver, were: climate; free indulgence in rich, highly-seasoned food; sedentary life, with constipation; gastro-duodenal catarrh; jaundice; pain and tenderness, and fever and rigors. On the other hand, suppurative inflammation of the liver is rare, and the pyrexia and rigors are usually attended with profuse sweating. Jaundice, to a marked extent, is generally absent, and when present is *per se* not a very valuable diagnostic symptom, depending as it does on a catarrhal swelling of the bile ducts or pressure on these ducts from accumulation of pus. Pain is not so acute or suddenly developed as a rule, unless associated with a local peritonitis. The question of malignancy was the one which gave most concern. Bartholow says: "When at or after middle life, in a patient with a history of former attacks due to gall-stones, there begins a fixed pain in the right hpyochondrium, and subsequently jaundice, the existence of a malignant growth in connection with the cicatricial tissue and ancient organized exudation should be suspected, and this suspicion will be confirmed if subsequently a tumor can be felt." Again, "and especially are organized exudations the favorite seats of cancer and new formations, those, for example, about the gall-bladder and cystic duct, resulting from repeated attacks of passage of calculi." The persistency of the pain, the history of a former attack, though of shorter duration, the contracted and adherent gall-bladder and the vomiting—age considered—presented an array of symptoms suggestive of malignant trouble. Yet the slow development, the fawn or bronze color of the skin, prior digestive disturbances, the peculiar cachexia and the existence of a tumor, were conspicuous by their absence.

The indications pointing to gall-stones as the cause of the trouble, are: climate; age; sex; sedentary life and indulgence in the pleasures of the table; history of a previous attack; the abrupt onset with the characteristic pain, followed shorty by jaundice, indicating biliary obstruction, which had not the time to form outside and occlude by pressure, but must be inside the duct or ducts preventing the transit of bile; the passage of typical gall-stones, though this may take place in connection with malignant disease; the gradual return to health, as indicated by cessation of all pain, vomiting or inconvenience of any description whatsoever in the regions of the stomach, gall-bladder and liver; clear, healthy skin and a re-accumulation of flesh to nearly 200 pounds.

I have reached the following conclusions: The diagnosis of simple gall-stones, especially when impacted in the common duct, as these were, is not always an easy matter. Two of these stones were lodged in Vater's fossa for a period of two months, in the case of the first, and three months in that of the second. The slight diminution in the severity of the symptoms, after the passage of the first stone, was due to the lessened distention in the duct by the one remaining. Sweet oil probably has some virtue in biliary obstruction, as evidenced by the copious discharges of bile following its first administration, and the expulsion of a stone after the second; but the fact that it was given several times without result—which in order to avoid details I have not mentioned—and two of the three stones accompanying the purgative action of cathartic pills, lessens to some extent the confidence in oil, giving rise to the thought that any active cathartic might do as well, and that the passage of the stones into the intestines was due to the combined influence of quinine and morphine. It would be interesting to know what per cent of obstructed bile-ducts take on malignant growth.

"I hear the Apache Indians have broken out again."

"How many have they murdered?"

"Nobody; they've got the measles."
—*Yale Record.*

COMMUNICATIONS.

THREE CASES OF PLASTIC NASAL SURGERY—FOR SADDLE-SHAPED NOSE, REMOVAL OF ENTIRE NOSE AND ARCHED ROMAN NOSE.*

W. W. KEEN, M.D.†

CASE I.—SADDLE-SHAPED NOSE REMEDIED BY THE PERMANENT INSERTION OF A SILVER-GILT PLATE.

On April 9, 1895, A. McG., a woman of twenty-five, was admitted to the Jefferson Medical College Hospital, for treatment of a deformed nose. Eighteen years previously she had fallen and fractured her nose. The bridge of the nose was almost entirely obliterated, being scarcely more than an eighth of an inch above the level of the cheek, thus tipping her nose markedly upward and also making her mouth very oblique. I was consulted as to the possibility of remedying the deformity, and Dr. Walter J. Freeman kindly examined the nose and found that there was no impairment of either breathing or smell. I decided not to interfere in any way with the bones, but to carry out the following plan: Dr. W. J. Hall, a skilful dentist, who has paid special attention to the cure of such deformities, first took a cast of the nose, and upon this built up a wax nose which was satisfactory to the patient, as well as to me. From this as a model he constructed an artificial bridge, consisting of two plates of silver soldered together; the posterior plate corresponding to the shape of the bones, the anterior plate (somewhat smaller) corresponding to the desired outline of the remodeled nose; the space between the two plates was left vacant, but was entirely closed by soldering them together. This made the piece to be inserted much lighter than it otherwise would have been. All around the margin a row of small holes was drilled, which, it had occurred to me, would fix the plate firmly in place by granulation-tissue pushing through the apertures and being probably later transformed into fibrous tissue. The plate was then polished and heavily gold-plated.

On April 19, 1895, a transverse incision was made just above the alæ of the nose, and the superficial tissues loosened as far as the lower border of the frontal bone on each side, and slightly toward the tip, below the transverse incision. My object in loosening the soft parts towards the tip of the nose was to prevent the edge of the plate from protruding. The gilded plate was then inserted, and the opening closed by Halsted's subcuticular suture. The suture was removed six days after its insertion. The highest temperature was 99.4°. A bleb formed over the bridge of the nose, but soon healed.

The gold plate has never caused the slightest inconvenience, and on seizing the nose by the thumb and finger, the plate seems to be very firmly fixed in place.

Up to the night before the operation, I had believed that my idea was entirely original, but on that evening Dr. Taylor pointed out to me a paper in the London *Lancet* for February 17, 1894, by Dr. S. K. Ellison, of Adelaide, South Australia, reporting the insertion of a nasal plate, which, from the description, I am led to believe was practically identical with my own. His operation was done in 1886, and after seven years the plate was still retained with entire comfort.

In a similar case I should be inclined to make an incision on one side of the nose sufficiently large to allow of insertion of the plate, with a very small incision upon the other side for the purpose of loosening the tissues from the bony and cartilaginous nose.

Since this operation was done, I have seen the notes of several somewhat sim-

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ilar cases. In the *Medical Record* of April 27, 1895, Dr. Weir reports the treatment of a case with a celluloid plate. He first attempted to use gutta percha, which proved unsatisfactory by reason of softening, and sometimes also was not tolerated. Later he hit upon celluloid, which had been used for closing apertures in the skull by Fraenkel, and this seems to have been very satisfactory. Attempts at inserting such plates through the nostril, which I also had considered, do not seem, as a rule, to be tolerated so well, as in two cases Weir was compelled to remove the celluloid plate, which lacked sufficient support from below. In two of his cases, through an incision in the cartilage within the nose, he chiseled out the bone and also removed a portion of the cartilage, thus restoring the contour. In another case he made a V-shaped incision inside of the mouth to bring down the lip. It will be noticed that in my own case the effect of raising the skin over the bridge of the nose has been to depress the tip of the nose and the upper lip, making what was a very oblique mouth a horizontal one and thus improving the appearance very much.

In the *Annals of Surgery* for June, 1895, Stimson also reports the case of a man, of twenty-five, who had a saddle-shaped nose from fracture. A piece of aluminum five-eighths of an inch long was inserted between the skin and the bones through a small incision in the alæ. As the outline of the nose was not satisfactory, a year later the wound was reopened, the piece of aluminum removed, and in its stead one of gutta percha, about half as large again, was inserted. The gutta percha in this case seems to have done very well.

In the *New York Medical Journal* of September 28, 1895, Foote has reported a case operated on by Bull, of New York, by means of a platinum bridge. In this case the upper lip and the nose were separated from the superior maxillary so as to expose the nasal bones. Holes were drilled into the left nasal bone and both superior maxillæ just outside the anterior nares. The platinum bridge had three supports, which were pressed into these holes. A steel pin was thrust through the nose from side to side, holding it securely in position. A considerable amount of swelling and headache followed the operation, but disappeared within a week. The steel pin was removed on the seventh day, and the patient left the hospital in seventeen days. The improvement was very great, but the outline of the nose does not seem to me to be quite as satisfactory as in my own case. There is apparently, however, the same improvement in the position of the mouth from the lowering of the tip of the nose. It seems to me that the multiple holes in the side of the plate are quite sufficient to hold it in place, if I may judge by the result of my single case, instead of the more severe operation resorted to by Bull.

Schimmelbusch (*Archiv für Klinische Chirurgie*, 1895, p. 739) condemns the use of all foreign bodies, including gold-plate bridges, ivory, etc., but the cases which I have cited in this paper show that he is quite wrong in his conclusions against them. In fact, I am by no means sure but that in the second case I might have been able to construct a new nose by a forehead flap, giving it shape by means of such a gilt-silver support.

CASE II.—REMOVAL OF THE ENTIRE NOSE FOR SARCOMA, WITH AN ARTIFICIAL NOSE FIRST OF ALUMINUM AND LATER OF SILVER.

W. J. L., aged fifty, was kindly sent to me at the Jefferson Medical College Hospital, December 3, 1894, by Dr. T. A. Enos, of Townsend, Del. The personal and family history was negative. About four years previous to coming under my care the patient had noticed a small wart on the left side of his nose. Two years later he tried various quack cures for it, when it began to grow, and when I saw him it was a circular tumor, one and one-half inches in diameter, extending from a little to the right of the bridge of the nose slightly on the left cheek. The skin of the right side of the nose was infiltrated, and also that of the left cheek to some distance from the growth.

On December 5, 1894, by knife, bone-forceps, and chisel, the entire nose, excepting a little bit of each ala and the septum, was removed, together with a small portion of the adjacent left cheek,

the skin of which was involved. The incision just grazed the inner angle of the left eye. The left antrum was opened slightly. The growth was found to have penetrated deeply into the nostril. The hemorrhage was moderately severe, but easily checked by the Paquelin cautery, hot water, and pressure. The entire wound was then packed with iodoform-gauze, and dressed as usual. The wound was sufficiently healed for him to go home the first of January, 1895.

The question arose then as to a new nose, and I decided not to do a plastic operation, but to have an artificial nose applied, because, *first*, not only was the nose removed, but a considerable part of the left cheek also; this would require so large a flap as to take a large part of the skin of the forehead and leave a very unsightly scar. *Secondly*, so broad a flap would not retain any prominence like a normal nose, but would flatten out as a mere flap of skin. And *thirdly*, I feared that so large a flap would probably undergo more or less gangrene.

Accordingly, I again invoked the kindly services of Dr. Hall, who constructed an artificial nose of aluminum, so as to be very light. It was constructed with a flange below, which hooked behind the bone, and at the upper end with a short lever actuated by a spring. The lever could be pulled down by a wire which was scarcely visible where it protruded through the artificial nostril. When the lever was pulled down by this wire, it could be pushed behind the projecting bone at the top of the large opening, and on releasing the lever the spring pushed it up just behind the bone and so held the nose in place without spectacles or other artificial means.

The lightness of the material from which it was constructed made the pressure both at the upper and lower borders so slight as to give no trouble. A very unexpected difficulty, however, presented itself after the lapse of between two and three months. The nose came entirely to pieces by the destructive action of the tears on the soft solder—hard solder cannot be used with aluminum. The metallic wire which pulled down the lever was made of equal parts of aluminum and tin, and this also was dissolved away. Dr. Hall, accordingly, made a second nose of coin-silver, which has answered very much better.

The new nose was painted to resemble a flesh-color as nearly as possible, and improved the patient's appearance very much, the large hole left by the healing of the parts being most unsightly. The disease so far has shown no tendency to recur.

CASE III.—A MARKEDLY ARCHED ROMAN NOSE CONVERTED INTO A STRAIGHT GRECIAN NOSE.

E. H., aged thirty, entered the Jefferson Hospital March 26, 1896. Six years ago he sustained an injury to the nose which rendered a congenital prominence still more marked. The nose was markedly arched, though no more so than many noses whose owners are quite satisfied with them. He stated to me that its appearance interfered seriously oftentimes with his obtaining employment as a waiter, and that he wished it made into a straight or Grecian nose, though he did not express it in these words; I tried to dissuade him from operation, as his nose was a very respectable one, but he insisted very strongly upon it.

Operation was performed March 26, 1896. A linear incision was made to the bone from near the tip to the base of the nose, and the soft parts dissected loose on each side. With a drill I then penetrated the bones of the nose about the middle of their length. This drill did not go through the soft parts, which were first retracted and then held out of my way by the drill which I left in place for the time being. I then chiseled out a piece of this shape, (), about twenty-two millimeters long and at its widest part five millimeters wide. This made an opening into the interior of the nose. I then attempted with a pair of strong forceps to crush the sides of the nose together, but found they were still very resistant. One or two blows of the hammer on a chisel just at the juncture of the nose with the cheek fractured the two sides of the nose. I was then able to bring them together very well. I then withdrew the drill and by means of a straight needle passed a stout thread of catgut through and tied it tightly. This held the bones in place. A needle threaded with another thread of catgut was passed

through the cartilage, which had been partially removed, and the tightening of this ligature brought the whole of it together very nicely. A little trimming of the surfaces was needed with the double rongeur forceps, and then I closed the incision in the skin with Halsted's subcuticular suture. The result was most satisfactory as regards shape, there being a good straight nose instead of the curved nose which the patient originally had.

He made a speedy recovery, without fever or suppuration, and was discharged six days after the operation entirely cured. The scar is scarcely visible.

A STUDY OF THE MAXILLARY BONES AND THEIR RELATIONS WITH SOME OF THE ADJACENT TISSUES.*

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It gives me much pleasure to have the opportunity of showing you photographic slides made from sections of the maxillary bones and some of their associated tissues. In doing so I cannot but think that many of the points that were new to me when brought out by these sections are known to many of you; if this be true I hope that you will still find novel material illustrated.

These studies have been made after the same method which the otologist has followed up his specialty of the temporal bone, in connection with its surroundings. The rhinologist in the same manner has taken up the nasal chamber, with its adjacent parts. These specialists have carried on their researches by making sections in all directions through the particular region in which each was most interested, their sections being made not only from articulated skulls and cleaned bones, but also those with their tissues dried upon them. So, here in the same manner, the mouth has been taken up, with its surrounding tissues and relations. These special studies naturally overlap each other. Both the rhinologist and the otologist have long since discovered kindred interests in the same region and a more exhaustive study of stomatology will carry the student to, if not into, the fields of other specialists. The main points to be considered are as follows:

In the upper jaw.—

1. The maxillary sinus and its relations with the surrounding tissues from fetal life to old age.

2. The shape and size of the sinus at various stages of development.

3. The relations of nerves and vessels passing through and along its walls.

4. The opening of the sinus into the nasal chamber.

5. The lateral surfaces of the nasal cavities, showing the complex structures that are associated with the nasal portion of the superior maxilla.

In the lower jaw the principal facts to be observed are:—

1. The U-shaped character of the cortical portion and the cancellated tissue within.

2. The inferior dental canal or the cribriform tube of the inferior maxilla, and the small tubes running therefrom to the teeth and to their interspaces.

3. The relation of the roots of the teeth to the canal and surrounding tissues, and the manner in which the nerves and vessels reach the teeth.

4. The sliding forward of the cancellated tissue within the U-shaped cortical portion of bone.

Slide No. 1 represents the anterolateral view of the skull, giving a general idea of the various external bones of one side of the face and head. The articulation of the teeth is almost normal. It gives the relations of the bones of which we are to speak to the other external ones. The outer surface of the lateral and interior wall of the antrum is shown, the teeth having been denuded of the external plate of the

*Lantern demonstration with remarks before the Philadelphia County Medical Society, March 25, 1896.

alveolar process; and, so removed, it will be seen that the maxillary sinus has been opened immediately over the roots of the first, second, and third molars, showing how thin, in this case, the bone is between the roots of the teeth and the floor of the sinus. It is also very thin over the points of the roots of the cuspid and first and second bicuspids.

I wish to draw attention to the position of the infraorbital foramen, which is generally described as the termination of the infraorbital canal, which passes through the solid portion of the infraorbital ridge to the groove in the floor of the orbit. Several of the slides to be exhibited will show that this canal otten passes diagonally through the sinus, somewhat in the shape of a tube—a point I have not noticed described in any work on anatomy.

On the inner side of the orbit is the os planum of the ethmoid bone, and at the inner anterior angle will be seen the opening of the nasal duct; these structures will be again referred to when viewing the internal structures of the nose. We shall omit speaking of the lower jaw until further on.

Slide No. 2 shows a perpendicular transverse bilateral section, made by passing through the anterior portion of the orbit, maxillary sinus, and the first molar of each jaw on either side. The eye has been divided just in front of the crystalline lens. Between the upper portion of the nasal cavities are seen portions of the middle ethmoid cells. In about the center of the floor of the orbit and roof of the sinus, which is very thin in this case, we find the infraorbital nerve in its canal, as generally described, and, below, the nearly triangular cavity of the maxillary sinus is seen, with a partial septum crossing transversely from the inner to the outer wall.

In the angle of the right sinus can be seen the anterior buccal root of the second molar, while on the inner wall is a portion of the palatal root of the first molar. The buccal root of the left first molar is easily seen passing well up in the outer wall of the sinus.

The central portion of this and the following slide gives a fine view of a transverse section of the nasal chamber. The septum in the center is remarkably straight—very seldom found so straight. Above the septum is the crista galli, to which the falx cerebri is attached anteriorly. On either side of the septum, at its upper attachment, is the roof of the nasal chamber. Running down on either side a little distance from this are the middle turbinated bones, the scroll-shaped bones below, hanging from the outer walls, being the inferior turbinated bones. The superior turbinated bones cannot be seen in a section in this position, as they are situated farther back. The space from the under surface of the inferior turbinated bone and the floor of the nasal cavity forms the inferior meatus, into which the lachrymal duct empties the fluid from the eyes. The space between the middle and the inferior turbinated bones is known as the middle meatus, through which the frontal and maxillary sinuses have their openings into the nasal chamber. The fluids from the middle and anterior ethmoid cells also pass through this meatus. Between the walls of the ethmoid sinuses and the middle turbinated bones is the unciform process. The spaces between this process and the outer walls of the nasal cavities are the semi-circular grooves generally known as the hiatus semilunaris. It is in this groove-like place that the excess of fluids passes from the various air-cavities, including the frontal and maxillary sinuses, out of the antrum at its upper anterior corner. Sometimes the opening is in the roof of the sinus, as will be shown. This groove passes backward, the uncinate process forming a guard to the opening of the maxillary sinus and thus preventing any foreign substance passing into the sinus.

We often speak of the fluid passing out of the sinus. It is a question in my mind if such is the case in a normal condition. It is more than likely the law of supply and demand is so governed that the parts are kept moist only, and the opening at the top so arranged as to prevent the undue loss of the fluid.

The openings of the maxillary sinuses are at the top, thus preventing drainage while the subject is standing or lying on the back; while the openings of the other air-cells or sinuses are so arranged as to make almost complete drainage.

Sometimes we hear of a "sound"

being passed into the maxillary sinus. This cannot be done in a living normal subject.

Slide No. 3 represents the anterior portion of the same section. At the upper superior angle is seen a string marking the passage from the antrum into the hiatus semilunaris. In the floor of the antrum will be seen another septum. On the left side of the subject will be observed the anterior buccal and the palatal roots of the first molars. In the outer and inner walls of the antrum, from a dental standpoint, the position of these roots, as shown in this and the last slide—also in the following one—should be very interesting. Abscesses of these roots could very easily open into the sinus. The extraction of these teeth, if not carefully done, would carry away part of the floor of the sinus. Also, by using much force in placing artificial crowns, the floor could be easily fractured. In the case of a breakage in extracting, the roots could easily be forced into the sinus by the use of root-forceps.

In the great majority of skulls examined belonging to the white race, roots of the molar teeth either pass up in the walls of the antrum or point directly to the floor, being covered only by a thin, conical portion of bone; and occasionally this lamina of bone is lost, leaving the point of the root uncovered. A specimen will be shown in which an abscess has broken through this thin partition into the sinus.

In the colored race the walls and the floor are much thicker; therefore, we do not, as a rule, find the roots of the teeth passing up into the wall or even near the floor of the sinus. The relations of the teeth with the sinus vary so much that no set rule can be accepted; in fact, all the bones and structures of the face vary greatly in themselves and their relations with other structures.

Slide No. 4 shows a section made perpendicularly, transverse just within the infraorbital ridge, by taking off the anterior wall of the maxillary sinus. In the upper portion is the anterior wall of the frontal sinus, on the left side the nasal septum, and within the septum the nasal cavity.

The inferior turbinated bone is seen passing from the external wall of the chamber between the upper portion of the turbinated bone and the nasal wall of the antrum. Here also is seen the anterior half of the nasal duct, commencing at the inner angle of the orbit and terminating in the inferior meatus. The hard palate and alveolar process also are seen. They are both about the same thickness in this specimen. This would not be a good subject for implantation of teeth. The right picture is a section made near the posterior wall of the antrum and the orbit, from the same subject as the other. The walls of the antrum, it will be noticed, are very thin, and on the upper right corner will be seen the posterior ethmoidal cells. These exceedingly thin bones generally indicate old age.

Slide No. 5 is a section immediately between the the two just passed, showing its anterior surface. On the upper right corner is the frontal sinus. These sinuses vary much in size and shape; the left may pass far over to the right, or *vice versa*.

To the left is the orbit, with part of the eyebrows showing. In the center of the wall between the orbit and the sinus will be seen the infraorbital canal, below which is the maxillary sinus, which in this case is very large. In the upper portion in the nasal chamber is seen the middle turbinated bone, below which there is a string passing through the middle meatus into the opening of the maxillary sinus. The posterior half of the nasal duct is shown, passing from the inner angle of the orbit to the inferior meatus.

The hard palate and the alveolar process are again shown to be about the same thickness.

Slide No. 6, shows two pictures, the left one being removed from in front of the right one. When speaking of the first slide, the general description of the infraorbital canal was given. This slide and a few others following, will show that the description given will not answer for all. These sections were made by removing the anterior wall of the antrum, passing perpendicularly downward. From the center of the floor of the orbit there is a septum, cutting off a portion of the sinus, forming an infraorbital sinus, which of course

is continuous with the true sinus. In the center of this septum-like wall will be seen a tube-like canal with the infraorbital nerve in place. Above this and at the junction of the septum with the floor of the orbit is an adjunct infraorbital nerve and canal. At the right, marked H S, is the hiatus semilunaris, into which there are many openings, among them that to the maxillary sinus.

In the right-hand picture, to the left of the septum is the opening from the infraorbital sinus into the true maxillary sinus. In the upper right-hand corner of the sinus the opening into the nasal chamber is well shown, passing into the hiatus semilunaris, guarded by the unciform process.

Slide No. 7 is a sagittal section just external to the infraorbital foramen. In the left picture there is, passing through the foramen and the canal, a piece of paper showing its direction, with a clear space over the tube-like canal. Another point of interest in this picture is the elevation of the bone over the roots of the first and second molars. Also within the floor of the sinus will be seen an opening through which an abscess has broken into the antrum from the palatal root of the first molar.

There are also elevations in the specimen over the roots of the first and second bicuspids, not seen in the picture.

In the left upper corner of the right picture is the outer portion of the infraorbital sinus, the lower border of which is about on a level with the tube for the passage of the infraorbital nerve and vessels. Below this process is an opening through the external wall of the maxillary bone. In this case the maxillary sinus extends into the malar bone. The teeth shown are the outer sections of those seen in the left picture.

Slide No. 8 is somewhat similar to the last one, being a sagittal section made internal to the infraorbital foramen. Here, again, the tube-like canal passes below an infraorbital sinus, a division of the true antrum. In the left picture, on the outer wall of the sinus will be seen grooves, the principal one running somewhat horizontally forward, giving off branches to the roots of the teeth.

It is often described that the artery and nerve pass to the teeth in the substance of the bone, from the posterior dental foramen in the tuberosity of the bone, and branches are given off in the bony structure.

This is the case only when the alveolar process is very thick and the sinus very small, and the roots of the teeth are not merely covered by a conical portion of bone in the floor of the antrum. But it is found in nearly all cases as shown, the nerves and vessels pass into the posterior dental foramen, then go through the bone into the sinus, passing into a horizontal groove, small branches passing from that to the teeth, the vessels and nerves being covered by the muco-periosteum while within the antrum.

Sometimes these grooves pass into small canals for a short distance. The main groove passes forward and terminates in the anterior dental canals, the passageway for the nerves and vessels to the anterior teeth. These latter structures are continuations of the posterior dental nerves and vessels. Immediately below the septum of the sinus in the anterior wall are seen several small openings where the anterior dental canals have been cut across.

In the floor of the antrum will be seen the conical cap to the roots of the teeth. Posteriorly is an opening over the buccal root of the third molar; anteriorly is an opening over the root of the second bicuspid.

The large opening in the right picture is the ordinary one found leading into the nasal cavity, as seen in the dried unarticulated bone.

Slide No. 9 is a sagittal section made near the inner wall of the orbit. The frontal sinus is seen at the top, and below this is the inner wall of the orbit, os planum of the ethmoid, including the edge of the inner portion of the floor, below which is the internal wall of the maxillary sinus. At the bottom will be seen an elevation of a tooth-socket. This specimen is made from an almost edentulous person.

It is my opinion that, as the teeth are lost, these elevations disappear and the floor of the antrum becomes smooth and comparatively even. The small divisions or septa, as shown in the second and third slides, disappear with age.

To locate the opening and the direction in which the excess of fluid would pass

from the sinus, a wire has been passed backward into the hiatus semilunaris. A perpendicular probe passes through the upper portion of the opening of the sinus, which in this case is partly in its roof or at the angle of the internal wall and the roof; as the straight probe passes out of the antrum, it passes through the infundibulum into the frontal sinus, showing that fluids could pass directly downward from the frontal into the maxillary sinus. These are specimens showing where the anterior ethmoid cells open just at the maxillary sinus. If the hiatus semilunaris should be closed by pressure on the septum or inflammation on the mucous membrane, the fluids from the frontal and ethmoid cells would pass into the antrum.

I had a patient during the past winter and spring who was troubled in this way, and in whom developed a fistulous opening into the mouth. The sinus was treated for several months without success. The natural opening of the sinus was closed, as proved by forced injections into the fistulous opening in the sinus. The fluid would not pass into the nasal chamber, and finally a large opening was made in the outer wall of the sinus, in order to make a better examination with the finger.

There was found a small tumor just below the natural opening. A curved probe could be passed through the opening in the direction of the frontal sinus. The tumor was then removed and a good-sized opening made into the nasal cavity, the patient recovering in a very short time.

Slide No. 10 is from a similar section of a different subject. It shows the opening of the sinus, running upward, where a small portion of bone has been cut away.

Slide No. 11 is a horizontal section made just below the floor of the orbit, the upper picture showing the roof of the two sinuses, with the nasal chamber and its septum between them. It will be observed that the openings of the sinuses were in the roof; on the left side there is a small probe passed into the sinus on the right side a portion of bone is cut away, to show the direction of the canal-like opening. In the lower picture a fair idea of the shape of the upper portion of the sinus is given. The two round openings seen on either side are for the passage of the lachrymal duct.

Slide 12 represents a section made from the same subject as the last one. It is a horizontal one, made through the middle of the orbit, and gives a good view of the anterior, middle and posterior ethmoid cells, and the septum of the nose at its upper portion.

Slide No. 13 is from a transverse section of a superior maxilla. The right picture is made a little above the floor of the sinus. It shows the elevations and depressions in the floor; in the center of the largest depression there is a small spicula of bone, an exostosis, caused by an abscess of the palatal root of the second molar; on the rim of bone just in front of the sinus is a canal for the passage of nerves and vessels to the anterior teeth. The center picture shows where a section has been made a little lower down, through many of the roots of the teeth, although leaving portions of the floor of the sinus in two places. The point of the palatal root of the first molar is in view, with a large opening on its posterior aspect, caused by the abscess spoken of. The left picture shows the cap turned over from the middle one.

Slide No. 14 is made from the skull of a seven-months' embryo. It is a transverse perpendicular section, just within the floor of the orbit. In the upper portion will be seen two openings into the brain-case, with the crista galli and the falx cerebri between them; below this is the nasal chamber, with its septum. Hanging from the outer walls of the chamber are the middle and inferior turbinated bones. In the middle meatus there is seen the unciform process, passing upward and a little inward from the base of the inferior turbinated bones. To the outer side of this process is the hiatus semilunaris, from which there is a small opening passing into the maxillary sinus, which is very small at this period of embryonic life.

The development of the sinus commences about the fourth month of fetal life by an invagination of the lining membrane of the nose within the hiatus semilunaris, in the position as shown in the picture. At the time the invagination commences and the eruption of the

permanent teeth, the greater portion of the superior maxilla is occupied by dental organs. As the invagination takes place and progresses, the cancellated portion of the bone becomes absorbed. This absorption of the internal portion of the superior maxilla is carried on in various degrees throughout life, until in old age the walls become exceedingly thin, as shown in slide No. 4. As this absorption takes place, the roots of the bicuspids and molars are encroached upon, until in many cases the points of the roots are covered only by a very thin lamina of bone; even this is sometimes lost, leaving only the muco-periosteum. The re-absorption and enlargement of the sinus occasionally extends into the malar bone, as shown in slide No 7. At first the sinus is somewhat spheroidal, but it eventually takes a more triangular shape.

The dividing lines between the malar and the maxillary bones are plainly seen. In the lower jaw it will be observed how much space is occupied by the germs of the teeth, leaving very little space below for nerves and vessels.

Slide No. 15 represents three permanent teeth, a central, lateral, and cuspid, that were removed from a living subject about eight years ago. The patient was past middle life and suffering from neuralgia. He had no teeth in the process of the right upper maxillary bone, the region of his pain. Most of them had been extracted in the hope of giving relief.

The antrum was opened by Dr. Garretson and myself in search of the cause. We were somewhat surprised to see the three crowns protruding into the sinus; the roots were imbedded in the inner angle of the wall of the sinus. After being extracted by a small tooth-forceps the parts were treated in the usual way, and relief, with subsequent cure, was secured to the patient.

The crowns, it will be seen, are normal in shape and quite healthy, the roots being more or less defective. The pulps were alive, and it might be said that the nerves were being infringed upon at the points of the roots, thus causing the pain. I have seen several cases in which a greater portion of a tooth was found within the antrum, but I think this is the only case in which three have been reported.

Slide No. 16 represents two cuspids impacted in the upper jaw, lying at nearly right angles to each other. They were entirely covered by bone, and were exposed by a surgical bur. The end of the root of the right one is somewhat curved. There is but a slight layer of bone between it and the floor of the sinus, it being perforated by three small openings.

The roots of each tooth lie across the alveolar process, which has prevented the second bicuspids from being fully developed. The end of the right lateral incisor has been pushed out of the process altogether.

Slide No. 17 is made from the same jaw as the preceding one; it gives a view of the right and left sides. It will be observed that the roots of the first molars on either side differ very much from each other. The end of the root of the right lateral shown in the right picture has been forced out of its true position by the impacted cuspid of that side.

Slide No. 18 is a lateral view of the nasal chamber, showing the three turbinated bones and the three meati in the central portion. The frontal sinus is large and well shown. At the right hand upper corner the sphenoid sinus is shown.

Slide No. 19 is made from the same specimen as slide No. 18, having a greater portion of the inferior and part of the superior turbinated bones removed and turned upward, and showing the inside of a lid and the cells below. A section of the inferior turbinated bone is removed, showing a probe passed into the lachrymal duct. The frontal sinuses are well shown, the upper one being the left sinus as it passes over from the left side; the under one is the right sinus passing inward and upward beyond the left, there being a very thin lamina of bone between them.

The infundibulum is plainly seen passing to the hiatus semilunaris. The hook-like process seen just below the infundibulum is the unciform process. In the recess back of this is the passage to the maxillary sinus, the process acting as a guard to the opening, and preventing a sound from being passed into the sinus in normal skulls. The anterior, middle and posterior ethmoidal cells, and the sphenoidal sinus, are well shown. In the posterior part of the nasal cham-

ber the opening to the Eustachian tube is seen.

Slide No. 20. Usually there are three scrolls or turbinated bones, but this specimen shows three well-marked ones and two smaller ones, making five meati and five turbinated bones. In many animals, as the dog and hog, the upper portion of the nose, or that which presides over olfaction, is filled with a large number of scrolls.

Slide No. 1 is the first shown for illustrating the upper jaw. It will now be used to describe the lower one. The lower jaw is made up of a U-shaped cortical or dense bony structure, the ends of the U terminating in the plates of the alveolar process. It may be said to open at the top, and in normal conditions the teeth are inserted into this U-shaped space. A slightly compact tissue, somewhat cribriform in character, surrounds each tooth. The remainder of the space is filled with fine trabeculæ, forming the cancellated tissue, through which passes the inferior dental canal, which I prefer to call the "cribriform tube of the inferior maxilla." It passes from the inferior dental foramen forward on the inner side of the ramus of the jaw, downward and forward through this U-shaped space to near the incisors. At first it passes along or near the inner cortical portion of bone; when it gets near the mental foramen it crosses over nearly to the outer cortical wall. Its depth after leaving the ramus is in the lower portion of the U-shaped space, and passes beneath the level of the mental foramen. This tube can be isolated or removed from a normal specimen, as shown in slide No. 22.

As the tube passes along it becomes more and more cribriform. Beneath the first molar it becomes so opened that the tube-character is almost lost, but passing forward it again resumes its original character.

From this main cribriform tube there are lesser branches passing to convey vessels and nerves to the substance of the bone; also in more or less curved course to the roots of each tooth. A little anterior to the mental foramen there is a cribriform tube passing backward from the main tube to the foramen for the accommodation of the mental nerves and vessels. This return canal is almost invariably the normal arrangement, but occasionally this tube passes from the main tube as it approaches the foramen. It will be seen in the picture that the anterior portion of the wall of the mental foramen has been cut away, thus showing the direction of the returned tube.

The small lateral tubes which serve as nerve-conduits from the main tube to the roots of the teeth pass upward and forward in a more or less curved direction, varying according to the position of the tooth, those going to the third molar passing almost vertically upward; in those to the second molar the forward direction is greater; in those to the first molar it is increased still more; the one to the second bicuspid has the longest curve of all. Sometimes, instead of commencing at the main tube, this one is an offshoot of the tube to the anterior root of the first molar. The tubes going to the before-mentioned teeth all curve forward and upward from the main tube posterior to the mental foramen. The small tubes going to the roots of the first bicuspid and cuspid are branches from the recurrent tube to the mental foramen, and are curved slightly backward as they pass to these teeth. The tubes going to the two incisors curve slightly forward as they pass upward to the roots. The finer tubes going to the interspaces and general cancellated tissue have the same general direction and curvature as those going to the roots of the teeth in their immediate vicinity.

The cortical U-shaped portion of the bone is the framework of the jaw, and forms the supporting structure; but it increases in length and breadth in a different manner from its contents. It is more than likely that it grows by interstitial process, each half having three fixed points, viz.: the ramus, the mental foramen, and the symphysis menti. There is no doubt that the distances between these points increase. The contents of this U-shaped space slide forward as the cortical structure increases in length, the teeth posterior to the mental foramen being pushed forward by each successively erupting molar, thus giving the curvature to the various small tubes going to the roots of the teeth, etc., and accounting for the stretching of the main tube until its

character is almost lost under the first molar. This also explains the recurrent feature of the tube in relation to the mental foramen. As its end is attached to the walls of the foramen, the mass of cancellated tissue is pushed forward in its process of growth, and the tube itself is carried with it, making a loop. The reason that the small tubes going to the first bicuspid and cuspid curve backward is that their points of origin have been carried forward with the return tube, as they belong to that portion of the tube. The small tubes going to the incisors curve slightly forward as they arrive from the continuation of the main tube near the point where it curves backward to the foramen.

Thus we see that the anatomic structure, the relations of the various teeth considered in connection with the order of their development, and more especially the direction which the lateral branches of the main cribriform tube take in connection with the roots of the several teeth, furnish us with a permanent record of the method of growth of the inferior maxilla during the period between childhood and adult life.

Slide No. 21 is the left side of the lower jaw of slide No. 1. It is enlarged, showing the fine net-work of the cribiform tubes throughout the cancellated tissue; in fact, they form the greater portion of it, the special ones going in a slightly curved direction to the roots of the teeth. A wire in the mental foramen gives the direction of the return-tube or canal.

Slide No. 22 is taken from a specimen in which the cortical and the cancellated tissues have been cut away, leaving the cribriform tube isolated, showing it as an independent structure, and not merely a canal through the bone.

Slide No. 2, repeated. The right side gives a good idea of the U-shaped cortical portion of the bone heretofore spoken of, with the root passing into it. Below the root is the cribriform tube and the nerves situated within it. This gives an idea of the position of the nerves below the root of the first molar. It can be imagined what damage would be caused by a discharge of infectious matter from this root within this cancellated tissue.

The slide also shows the floor of the mouth and tongue cut transversely.

Slide No. 23 shows the anterior portion of the lower teeth in position. The principal object in showing this slide is to explain why it is often difficult to extract the second bicuspid from a jaw that has lost no teeth. It will be seen in this case that in a transverse section the roots of the second bicuspid are nearly in a line transverse with the anterior root of the first molar. The roots are also very long, extending below the root of the molar and nearly down to the inferior dental nerve. The bone at this point is usually more compact than farther back. Taking these points into consideration, this accounts for the difficulty in extracting these teeth without breaking them, and of course we must also consider that the root itself is not a strong one.

Slide No. 24 represents the lower jaw cut lengthwise nearly through its center, exposing the cancellated tissue, the sockets of the teeth, and the cribriform tube or inferior dental canal, with its branches going to the sockets of the teeth. As the tissue is very frail, much of the trabeculæ is lost. The outer section shows the direction of the recurrent tube for the accommodation of the mental nerve and vessels.

Slide No. 25 represents a metal cast, showing the size of the cancellated structure within the U-shaped portion of the body of the bone. It was made in the following way: After the openings of the sockets of the teeth were covered by pieces of paper, a slender tube about eighteen inches long was attached so that its lower opening was in connection with the inferior dental foramen. The bone and the lower end of the tube were invested in plaster of Paris with a a little asbestos. After this was thoroughly set and dried, and made about the temperature of 212°, fusible metal was poured into the tube, passing along the metal tube into the canal or cribriform tube and along its course, sending the metal out through its many openings into the cancellated tissue and the sockets of the removed teeth. The body of the bone and the lower portion of the ramus were placed in a ten per cent. solution of potassium hydroxid. This dissolved the bone away, except particles seen as white spots which penetrate the metal through the cancellated tissue. A transverse section of this preparation

would show fine bony tissue passing all the way through.

The upper picture represents the inner surface, showing the size of the canal or tube, and it might be said that it represents the space occupied by the nerves, blood-vessels, and their membranes. The lower picture shows the outer surface, and the projection seen is where the nerves and vessels pass out of the mental foramen.

Slide No. 26 is a horizontal section of the upper and lower jaws. It is made a little above the free margin of the alveolar process of the upper jaw and a little below that of the lower. It gives the shape and position of the various roots, with their relation to the process and to each other at this joint. Particular attention is drawn to the fact that there is so little space between the roots and the plates of the alveolar process that it would be impossible to force the beaks of forceps between the roots and process without breaking the latter on one or both sides. The lines in the cut represent the strongest axes of the teeth.

Slide No. 27 represents a section cut horizontally through the lower jaw, made near the end of the roots, from the same subject as the last slide. The cancellated portion, with the soft tissue filling the spaces, is well shown. At the posterior part of the picture the nerve is seen passing into its tube. The ends of the roots of the second and third molars, the tip of one of the roots of the first molar, the roots of the first and second bicuspids are plainly seen. A little of the lateral incisors will be noticed. The centrals do not go down so far.

The illustrations we have been going over represent the lower jaw in the normal state. Those following will show various conditions of abnormality.

Slide No. 28 represents several sections of a lower jaw, not quite normal, there being evidences of past inflammation. Several teeth have been extracted before death, which changes the character of the jaw. Some of the sections show but one canal, while in other places there are many, and it takes close observation to tell in which the nerve and vessels have passed. In the operation of making a section or removing the whole nerve from the bone, a surgeon not familiar with this condition of things might easily clean out a portion of a canal, but not touch the nerve. This accident might not happen in a dried bone, but in the living the parts are so vascular, mistakes could be easily made.

At section D it will be seen that the distal root of the second molar penetrates the true nerve-canal. In the case of an abscess of this root, the discharge would flow into the nerve-canal; from this it could pass backward or forward along the nerve, and would give great pain by compression.

A baffling case of abscess on the external part of the lower jaw, just above the facial notch, can be explained, I think, by this specimen. The patient suffered great pain in the lower jaw. Finally a swelling made its appearance; the first molar was much diseased and was extracted, but this gave no relief. The swelling was lanced, from which a small quantity of pus was discharged, but this kept up for two months, when he came to the hospital and was treated in various ways without success.

The teeth for a time were dismissed as being the cause, and cultivations were made from the discharge, to see if it were a tuberculous disease, but without results. The discharge was then examined by the microscope, to see if there were salivary corpuscles in it, but none was found. The second molar was in position and responded to heat and cold; finally a rubber-dam was placed over the second molar, and gently approaching the pulp-chamber, it was ascertained that the nerve in the distal root was in a decomposed state, while the anterior branch was vital.

This was devitalized at once and the decayed matter removed from the distal root, after which carbolic acid was forced down into and through the root by the use of softened gutta-percha.

In a short time the carbolic acid made its appearance at the external opening on the jaw. The tooth was filled with gutta-percha and the patient dismissed. From 4 P. M. until the next morning carbolic acid worked out through the opening, when the parts closed and did not again open. The question was then asked, how could a bone-fistula close so quickly, and why was there no discharge

of broken-down tissue through the opening?

It can be explained by this section. If the discharge from the patient's tooth flows into the canal, like the one shown, it would have an easy passage along the canal, backward and out of the foramen, then down along the bone until it came in contact with the sheath of the internal pterygoid muscle, which could direct it into the submaxillary triangle and then pass out at its weak point, the opening for the facial artery. If such were the case, carbolic acid would clean this fistulous canal in such a manner that it would heal up at once.

Slide No. 29. Since making the preparation for the slide just passed, I have found a specimen in which the roots of a third molar passed out through the inner wall of the lower jaw, a considerable distance below the mylo-hyoid ridge, as shown in the picture before you.

If this tooth had become diseased, it would have discharged its matter at once into the submaxillary triangle. I fully believe there are many unrecognized serious cases in which teeth of this character, when devitalized, cause pus to pass into the tissue of the neck, and even into the thoracic cavity. If diseased teeth in this region do not respond to treatment at once, they should be extracted. It is of much more importance than the saving of a tooth, as not only can ill health result, but death often occurs.

Slide No. 30 represents two views of an impacted third molar. In the upper one the tooth is in the position found when the cap of bone was removed; in the second view the tooth has been rolled out of its socket, showing its inner surface. The bed of the tooth is also shown. The second molar is a devitalized tooth, the distal root of which shows where the impacted tooth has pressed against it. Not only has it done this, but it has also caused absorption of a portion of the root until the pulp-canal within the root is fully exposed, and it must have caused neuralgia in these parts. The roots of the impacted teeth have a slight curve inward at their points; the concavity fits immediately over the inferior dental nerve, and more than likely caused pain by pressure.

The ends of the roots are not fully formed, the apical openings being large. It will be noticed that the roots of the teeth in this jaw are longer than usual, the cuspid passing below the nerve and to its outer side.

Slide No. 31 represents another impacted third molar, situated on the inner side of the jaw, and pointing slightly downward. The distal root of the second molar is slightly absorbed. On uncovering the tooth and taking it from its bed, it was found to be incased in a thin shell of bone as though the dentinal sac had ossified separately around the tooth. The inner portion of this shell is still in position; the nerve and its accompanying tissue is seen passing into the inferior dental foramen immediately against the shell, and has the appearance of being flattened out; it divides and sends a branch around the internal half of the shell. Here again must have been an obscure cause of neuralgia.

Slide No. 32 is made from the left and right halves of a lower jaw, one showing the internal surface of the right half, while the other shows the external surface of the left. In that of the right we find the roots of the third molar curved backward. It is also enlarged by an abnormal deposit of cementum until the independent character of each root is lost. This, I think, has been caused by the vascular excitement localized in these parts.

Not only have the roots become enlarged, but the surrounding bone has become much thickened, and the cancellated tissue of the jaw has lost its fine structure and become more solid.

It would have been impossible to have extracted this tooth without breaking quite a large piece from the inner side of the jaw. A fracture at this point often produces serious results; the mylo-hyoid artery is liable to be lacerated, or even broken, and the hemorrhage is difficult to control. The consequent inflammation will often cause the lack of free movement of the jaw. It also interferes with deglutition, speech, etc., and even the glottis may become closed.

The left half of this jaw shows an impacted tooth pushing directly against the tooth in front of it. The roots of this tooth have become much enlarged by deposit of cementum. The sur-

rounded bone is also thickened and more compact.

Slide No. 33 is taken from a section made transversely through the lower jaw at the mental foramen of each side. On the left side the cortical U-shaped portion of the bone and the cancellated tissue is in about a normal condition, while that of the right side, the cortical U-shaped portion, and the cancellated tissue have changed. The former has thickened and become more dense, while the latter has become filled with secondary bone-deposit. The only reason that can be given for this difference is that all the teeth on the right side were in good condition, while on the left side the first molar had been much diseased, causing an inflammation of that side of the jaw, the vascular excitement having caused the activity of the osteoblasts of this region to build this bone.

RESOURCES OF CLIMATE IN HEALTH AND DISEASE.*

In studying the physiological and pathological characteristics and influences of the different climates on the human economy, the first observed results on experiencing a *hot climate* may be thus approximately outlined:

1. The circulatory and respiratory systems are immediately but not permanently stimulated, the breathing and cardiac movements being accelerated.
2. The body temperature is definitely increased, the elevation amounting to as much as 1° Fahrenheit, and persisting for years, if not permanently.
3. The appetite is correspondingly increased.
4. The kidneys and sexual system are involved in the prevailing condition of excitation. Puberty in both sexes is inclined to precocity, the animal nature maturing at an early age in comparison with its development in colder climates.
5. There is a marked tendency to enlargement of the liver.
6. The individual loses weight and tends to become spare, notwithstanding the increase of appetite.

Nature's two prime tonics, antiseptics, germicides and restoratives are *pure air* and *sunshine*. In comparison, all the products of the laboratory and the lists of the pharmacopæia are rubbish and dross. It follows that the value of any climate to the hale man, or to the invalid, is in exact proportion to the opportunity and inducement it extends to him to avail himself of these potent agencies. Beside this crucial test the readings and indications of all the complicated meteorological instruments are scientific shoddy. Climatologists need a *comfortometer*.

Climate is unquestionably a controlling factor in establishing the death-rate of any community; but the mortuary statistics are proverbially unreliable, since the records are so carelessly kept and so indiscriminately compiled. Official and compulsory records, extending over long periods, will be required to make these tables accurate, or even passably reliable guides. From those at hand, some approximate inferences may, however, be deduced.

The average annual death rate of the several European countries is thus stated:

France, one in thirty-two; Prussia, one in thirty-nine; Austria, one in forty; Norway and Sweden, one in forty-three; Denmark, one in forty-five; England one in forty-six.

The average annual death-rate for the United States, based on less reliable data than the foregoing, however, has been stated as follows:

Gulf States, one in sixty-three; other Southern States, one in seventy; Mississippi Valley and Atlantic States; one in eighty; Western States, one in eighty-one; Pacific States, one in one hundred and fifteen, and Northwestern States, one in one hundred and twenty.

Setting aside a wide margin on the score of incomplete and inaccurate data, and in the face of the fact that various European localities have acquired a world wide reputation for healthfulness, it appears evident that the climatic conditions found in favored portions of our own country, as well as throughout the entire Union are more conducive to health, enjoyment and longevity than any found in Europe.

*S. S. Wallian, M.D. The *American Therapist*, May 1896.

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PHILADELPHIA, SATURDAY, JULY 25, 1896.

EDITORIAL.

RELATIVE SEXUAL PURITY.

The question of sexual morality is, in every civilized community, always an issue of great practical importance. It is also one which must be considered apart from other infringements of civil and religious codes, since its root is a perfectly natural physical craving. Yet it is the worst possible sophistry to place sexual indulgence in the same category as the satisfaction of the appetites for food, water and oxygen.

Our attention is claimed, at frequent intervals, by persons who choose to discuss the matter of sexual purity, not so much from the moral and religious standpoint, as from the social and, in particular, as regards the question of sexual equality. The person who simply states that illicit intercourse on the part of a man is a grievous wrong, not only against morality but against the stability of decent society, leaves nothing for discussion. But when a man or a woman attempts to weigh the relative responsibility of the sexes in such matters, to cry out against a society which condones in a man the offense which it will not forgive in a woman, to raise the complaint of unfairness, we believe that some discussion is in order. In any case, we believe that any attempt to raise the standard of morality by

balancing the one sex against the other, will result in leveling downward, not upward.

Statistics are, manifestly, out of the question, but the experience of almost all who have mingled in ordinary worldly circles is to the effect that male sexual impurity is common, and that the fact is quite freely admitted and with few expressions of genuine regret or shame. On the contrary, shame is not very infrequently expressed by those who have remained continent. If straws show the direction of the wind, we may quote with significance the reply of an eminent divine who was urged to preach against some offender whose sin had become a public matter: "Let him who is without sin, cast the first stone." Much as we may deplore this condition of affairs, can we contrast it for a moment with that of any community, real or imaginary, in which female virtue is on the same level, and adhere to the proposition that it is no worse for a woman to sin against her sexual purity than for a man? There may be no truth in the beautiful sentimental belief that the child, growing in its mother's body, absorbs not only nutrition for its physical development, but much of the spiritual and moral essence of the mother's nature, but it is beyond doubt that she contributes by mere heredity, at least, equally to the psychic make-up of the child. Under normal circumstances, it is the mother far more than the father who has to do with the early training of the immature mind and soul. How can pretended moralists ignore the fact that an impure mother exerts many times the evil influence over the tender mind of her offspring that the father possibly could?

The advocates of sexual equality, from the point of view of fairness, overlook many important points and, in calling attention to these, we do not wish to be understood as condoning masculine impurity, but simply as indicating that the whole question must be considered apart from all such arguments. First of all, civilized society of both hemispheres is controlled by women. If they do not choose to be "fair" to the female outcast or to shut their doors against the roué, it is certainly not because they are ignorant of the social evil, nor because they are compelled to such an inconsistency by men, but because they act in accordance with impressions and intuitions which are not always logical, but which rarely fail to be practically wise.

It must also be remembered that society, as a whole, requires just one thing of the average woman—chastity. It does this through an appreciation that the process of reproduction, either anatomically, physiologically, pathologically, or intellectually and spiritually considered, involves the entire woman as it does not involve the entire man. While society at present does not require male chastity, it puts many responsibilities on the shoulders of the man. Business and social dealings which would be considered absolutely dishonorable on the part of a man are readily excused in a woman, and many acts of self-denial are imposed on the former for the sake of the comfort and convenience of the latter. Society also expects the average man, as husband, father or brother, to support the average woman and, so far as practicable, it enforces obedience to this custom. Laws and legal precedents concerning actions for breech of promise favor the woman, even to the extent of assisting her in levying blackmail. The law removes

from the married man the right of absolute ownership in realty, except in a few western States, and even there the homestead falls under the old law. In return, it expects, but makes no provision for enforcing, a moderate amount of assistance by the wife. Cases have occurred, within the past few years, in which wealthy and able-bodied women have sued invalid husbands for non-support, although, to the credit of the sex, it must be admitted that failures of wifely devotion are rare indeed. In the event of unhappy marriage, the law affords the woman every possible mode of relief, while the man's choice is, practically, only between proving adultery or of abandoning his business and losing his identity in a throng of strangers. Lastly, the law protects the chastity of all girls until sexual maturity is reached, and of all women, except as they freely renounce this protection, under penalties almost equaling in severity those for the taking of human life.

Masculine innocence, on the contrary, is almost unprotected. This omission, we believe, is the weak point in the crusade for male virtue. Childhood ought to be equally sacred, whichever the sex. We have known of a little boy being stripped by young women supposed to belong to "good society;" while the very worst rake with whom we have had personal acquaintance dated his career of sexual impurity from the time when, as an innocent school-boy, he was seduced by a teacher. Similar outrages against male decency are not extremely rare, though they are seldom or never made public. So long as all responsibility is on one side, so long will requirements of virtue remain one-sided.

In conclusion, let us again remind our readers that we are not pleading for laxity of morals on the part of men, though we do claim that the preservation of the race and the maintenance of orderly society inevitably depend, to a far higher degree, upon female than upon male virtue. It must also be evident that, so long as society requires of women not much more than an avoidance of actual criminality and relieves her, so far as possible, of the burdens of life in recognition of her moral and physical function in reproduction, a more rigid standard of sexual purity will be demanded of her. And above all, we wish to emphasize the opinion that any rational attempt at securing male virtue must abandon the contemptible premise that sexual laxity is a privilege, and must strike at the root of the evil by extending the same protection to childish innocence and adolescent folly in the boy as in the girl.

Medical Bicyclers.

A Brooklyn doctor is organizing a bicycle club to be made up exclusively of Brooklyn physicians. It is proposed to use the wheel in the discharge of professional duties, making calls, and so on. A number of doctors in that city have discarded the horse and carriage, finding the wheel much cheaper, and at the same time it affords some exercise. The promoters of the movement believe that a doctors' cycling club will lend considerable dignity to the sport of wheeling. The project started among the students of the Long Island College Hospital, where a large number of them have very little exercise, but who feel the need of it.—*American Medico-Surgical Bulletin.*

The gratitude of the patient for the physician is well known to me. It is part of the disease. It comes on with the fever, it improves during convalescence, and is cured by return to health. —*New Orleans Medical and Surgical Journal.*

SOCIETY REPORTS.

PHILADELPHIA COUNTY MEDICAL SOCIETY.

Stated meeting, Wednesday, March 25, 1896.

By invitation of the directors, DR. M. H. CRYER presented, with lantern illustrations,

"STUDIES OF THE MAXILLARY BONES."

[See page 112.]

DISCUSSION.

DR. B. ALEX. RANDALL said that as the antrum of Highmore is the meeting-ground of laryngologists, ophthalmologists, dental and general surgeons, it must be viewed in many different aspects. It is from the ophthalmic point that he had generally studied it, as not infrequently affections manifested about the orbit have their origin in antral inflammation. Such lesions may undergo spontaneous cure; and although the position of the antral opening is highly unfavorable to drainage, if men were always as upright creatures in fact as in theory, it must not be forgotten that we often lie down. Drainage of the sinus can often be very satisfactorily achieved, even when the opening is considerably narrowed by swelling, if the head be properly inclined. Dr. Randall has himself occasionally indulged unwisely in acute inflammation of the antrum, and discovered accidentally the cause of his severe "toothache" by stooping over and draining away, with immediate relief, nearly a dram of yellow serum. The same result may often be gained with patients, Bayer and others recommending that the head be hung down by bending over the back of a chair while the hands rest on the seat.

The natural opening of the antrum may be closed by inflammatory thickening, either of its own margins or of adjacent parts; and the accessory opening, often present, may be equally occluded. Cocain-shrinkage may only facilitate access, not affording drainage; but the syringe-canula may in many cases be introduced into the semilunar hiatus by pressing aside the valve-like tissues, and with it this cavity or the frontal sinus may be washed out.

DR. G. G. DAVIS said that a debt of gratitude is due to anyone who will throw light upon disease of the various sinuses that enter into the nasal cavities, as the diagnosis is often very obscure and the treatment exceedingly difficult. This will readily be appreciated when one considers that a discharge coming from the middle meatus may start from the anterior ethmoidal cells, from the frontal sinus, or from the antrum of Highmore. They all open at practically the same spot, the infundibulum. One has to rely upon collateral symptoms to establish a diagnosis. Even after an approximate diagnosis is made, in some cases it is almost impossible to apply any treatment. Take a disease of the ethmoidal cells as an example. It has been suggested by Bryan that they should be curetted away. Bosworth advises the use of the dental drill. When it is considered that the ethmoidal sinuses are covered by a thin scale of bone, separating them from the brain, and when it is remembered that on their outer side is a membrane of bone which is likewise extremely thin and which constitutes part of the inner wall of the orbit, and that the lachrymal canal also passes through the bone, one can appreciate the dangers of attempting promiscuous drilling in this situation, particularly when the least disturbance produces such a flow of blood as to prevent one from effecting these procedures under direct ocular inspection. In the treatment of diseases situated in the anterior or middle ethmoidal cells and frontal sinus, Dr. Davis suggested the following procedure for trial: In endeavoring to cleanse the frontal sinus, he had the patient placed in the supine position, with the head hanging over the edge of the table. Any solution injected through a canula introduced into the infundibulum will trickle by gravity down into the sinus, particularly if the fluid employed be an effervescent one like hydrogen dioxid, for example. A far better cleansing can be secured through the various cells in this way than if the patient be in a sitting position with the head upright. Of course, this is simply a moderate and not the most radical means of curing these affections, but it is one that seems worth trying.

DR. CRYER, in closing the discussion, said that during his studies he had not found a normal skull in which it would be possible to pass a sound, but he had seen many pathologic skulls in which this could be done. Speaking of drainage, he said that if a person should stand on the head or lie on one side the antrum would, of course, drain itself, but in the erect position or lying on the back there could be no drainage, as the normal opening is at the anterior superior angle of the sinus. Occasionally the opening is in the roof of the sinus, and there are cases in which it passes into the infundibulum of the frontal sinus.

DR. G. HUDSON MAKUEN presented a paper, entitled

"AN UNUSUAL ALVEOLAR ABSCESS WITH ANTRAL COMPLICATIONS."

[See page 100.]

DISCUSSION.

DR. B. A. RANDALL said that the point made as to suction is well taken and can be verified by frequent observations. He had known of instances in which an inflamed antrum that had been perfectly permeable in the evening to the electric light was completely closed by the next morning, apparently as the result of blood extravasating into the mucous membrane rather than into the cavity. The sniffling efforts of the patient, caused by the slight irritation, had a cupping effect upon the lining of the antrum, distinctly and uncomfortably recognizable at the time, and formed the only explanation that could be given for such a rapid and complete clouding in such a few hours.

DR. G. G. DAVIS said that inasmuch as there is only one opening in the antrum, he could not see how it is possible for suction to take place; because for suction to exist, there must be a posterior, as well as an anterior opening, or a vacuum would be created. As to drainage, such an excessive amount would indicate an overflow. The first opening in this case was apparently a small one, made through the tooth itself. For the excessive amount of secretion which is said to have been present, this would hardly be a sufficient opening. One could not call it free drainage, and as evidence of this condition, as soon as free drainage was established, the discharge ceased.

DR. MAKUEN, in closing the discussion, said that the outer wall of the alveolar cavity and of the antral cavity was very thin and the probe passed up into the antrum just within this wall, and the plate of bone was felt to yield a little under the pressure of the probe, or the nozzle of a small hard-rubber syringe. As soon as the antrum became involved, the discharge appeared in the nose and diminished through the opening into the mouth. Dr. Makuen had observed in nearly all his cases that drainage takes place through the ostium maxillare even when there is a large opening through the alveolar process. He suspected that nasal respiration may be a causal factor in this phenomenon. The interesting points of the case are that an abscess should form on the covering membrane of a tooth so far removed from any external influence and that it should cause so much disturbance.

DR. JOHN B. ROBERTS read a paper, entitled

"CASES OF ARTIFICIAL ANUS AND FECAL FISTULA SUCCESSFULLY TREATED BY INTRA-PERITONEAL OPERATION."

[See page 97.]

DISCUSSION.

DR. E. W. HOLMES contended, with regard to time of operation, that this should be performed as soon as possible after the inflammatory symptoms have subsided and adhesion has taken place. After this there is considerable cutaneous irritation and eczema, which cause great inconvenience to the patient and may interfere very much with the nutrition. After the fistula is established, there may be constriction at the distal end of the bowel, which would interfere with the passage of feces and add to the difficulty of the operation. Dr. Roberts said very little with regard to the form of operation. It seems that it is a question whether or not the Murphy button should have been used, as it might have expedited the operation in this case. When the intestines are adherent to each other, it would perhaps be unwise to use the button, as in some cases it might not pass down easily. Since the success which attended Dr. Roberts' operation, Dr. Holmes has had a much more favorable opinion of circular enterorrhaphy than before. Dr. Roberts performed the operation by putting the sutures at four points equi-distant and then completing with a double row of Lembert sutures. In the case at the Methodist Hospital, the bowels were so matted together that it may have been impossible to separate them. The success of Dr. Roberts' operation has justified his decision in the matter, but it might be interesting to discuss this question of adhesion, as many obscure symptoms result from them. Examination of the viscera of many bodies has shown that adhesions are very common and patients with various forms of abdominal injuries frequently suffer from obscure symptoms which seem to be the result of adhesions. As to the necessity of breaking up such adhesions, reference was made to the statement by a prominent gynecologist recently that he never broke up intestinal adhesions, while another prominent gynecologist always breaks them up with greatest care, and this would seem perhaps the more rational method of treating these conditions, although it would prolong the operation.

DR. MORDECAI PRICE said that the question of artificial anus brings up several questions. It is nearly always the result of strangulated hernia, or the choice of the surgeon. It is produced by hernia when the bowel is completely strangulated. There is no question about the propriety of the operation, or the kind of operation. There is probably no method as good as the Murphy button and end-to-end union. There should be complete separation of the bowel from its adhesions and also all adhesions in the abdomen, for the simple reason that, if they are left in complete hernia and much time has elapsed between the time of the formation of the artificial anus and the time of operation, the surgeon has no proof of the patulous condition of the bowel. It is, therefore, better to release all adhesions and bands. It would be impossible to use the Murphy button when the bowel is thickened and indurated at the seat of operation. It has been Dr. Price's method to reset such portions as are thickened, and introduce the Murphy button into a healthy portion of the bowel. After being placed in position, this union is reinforced by a Lembert suture, and then the

mesentery is sutured. Failure or leakage does not follow this use of the button. It is useless to do the operation without releasing adhesions. Dr. Price related an exceptional case in which serious trouble followed this procedure. An artificial anus was established within a short distance of the stomach. The patient was much emaciated and in bad condition. Many feet of bowel matted together in the region of the strangulated hernia had to be separated and quite a large piece removed. The patient was unable to stand the operation. Although she lived for several days, she never properly reacted. From Dr. Roberts' description of his case and from the excoriation of the abdomen from the discharges, it would seem that the opening in the bowel must have been high up. It has been Dr. Price's experience in these cases that the digestive fluids high up in the bowel excoriate very much. A number of surgeons have performed lumbar or inguinal colotomies when the skin was almost unaffected.

In those cases in which the irritation is very great and the lesion in the bowel high up, the necessity is greater for immediate surgery. Dr. Price considered the Murphy button a life-saving instrument. He believed that the method is all right and that it applies perfectly and that the time of operation is greatly shortened, but he would hesitate to use the Murphy button in what is called anastomosis, when a knuckle of bowel is left out and when the button may drop in the loop. On the other hand, he would have no hesitation in uniting the bowel with a simple suture and had done so a number of times. The old methods of anastomosis were all right in their way, and it was simply a step in the right direction. Dr. Price had used the Abbe rings in several cases with great satisfaction. With regard to fecal fistula, unless the bowel comes into direct contact with the abdominal walls, the fistula should always close. This has been demonstrated in many cases. Dr. Price has seen a number of cases in which the bowel was patulous and the gangrenous process had gone on in its destruction at the head of the colon in bad cases of appendicitis, leaving a number of holes at the head of the colon. Light packing and rubber drainage were followed by free discharge of fecal matter from the bowel. Union had been perfect in all these cases in the course of ten days or less. Fecal fistulæ may occur in the descending colon in the sigmoid flexure and in the transverse colon as a result of inflammatory conditions. In other words, a gangrenous ovary and tube lying in contact with the bowel is likely to lead to gangrene of a portion of the bowel.

With regard to glass drainage-tubes, various accidents have been unjustly attributed to their use. Dr. Price referred to a case presenting a gangrenous spot in the bowel in a case in which he knew that a fecal fistula would be the result. To avert that condition he used glass drainage. At the end of forty-eight hours gas and contents of the bowel were being discharged through the tube.

Dr. E. E. Montgomery endorsed Dr. Roberts' method of opening the abdomen, as by that means the surgeon is better able to bring healthy ends of the bowel together and insure more thorough and certain union. The only criticism to be offered concerned the case in which the intestine was brought up and attached to the opening. It would perhaps be a better plan to have resected the intestine as a primary operation rather than to have left it as long as it was left, and allow the continued suffering of the patient. With regard to the adhesions of the intestine, it seems better to break them up, as one is uncertain in regard to the patulousness of other portions of the bowel. The method of treatment is an important one. Ordinarily, breaking up the intestines leaves a raw surface which may become adherent and possibly give rise to disturbance subsequently. In a case in the Philadelphia Hospital some years ago, following an operation by one of Dr. Montgomery's colleagues, the patient had all the symptoms of obstruction. In this case a large amount of the bowel was broken up and a volvulus was found. When this twist was undone, the abdominal cavity was filled with a solution of boroglycerid and this was left in the abdomen. A drainage-tube was introduced and through it the same fluid was occasionally injected. Dr. Montgomery had an opportunity of operating upon this patient some two years later for ventral hernia. Remembering the previous operation, he expected to find many adhesions, but on opening the abdomen there was but one adhesion. This result shows how these cases will recover.

Dr. Roberts added, with regard to Murphy's button, that he had often had it with him in operating, but he had never yet used one because he had thus far always decided to use suturing, and possibly because he did not like to complicate things. In the case mentioned, in which he did a resection and end-to-end union, he thought very strongly of putting in a Murphy button, but did not because the old adhesions would have compelled the button to travel a very tortuous course and there was danger of its becoming entangled in the lumen of the intestines.

Dr. Howard F. Hansell presented "The Report of a Case of Sudden Blindness from Nasal Disease."

[See page 101.]

DISCUSSION.

Dr. B. A. Randall said that he had seen several cases something like that reported, but they are certainly unusual and raise a very difficult problem. The sinus-inflammation theory is the best to account for some of the symptoms; and the hemianopsia could possibly be explained by the retinal edema.

Dr. Hansell said that, up to the present time, the boy had regained light-perception in the temporal parts of the retinæ, but the central fields, in which vision was lost from the beginning, were still blind. He agreed that the prognosis was unfavorable.